

Tooth Whitening

DropBooks

E. Hewlett, D.D.S.



Tooth Whitening – Why?

- Whiter teeth are associated with perceptions of
 - Youth
 - Attractiveness
 - Self-Confidence



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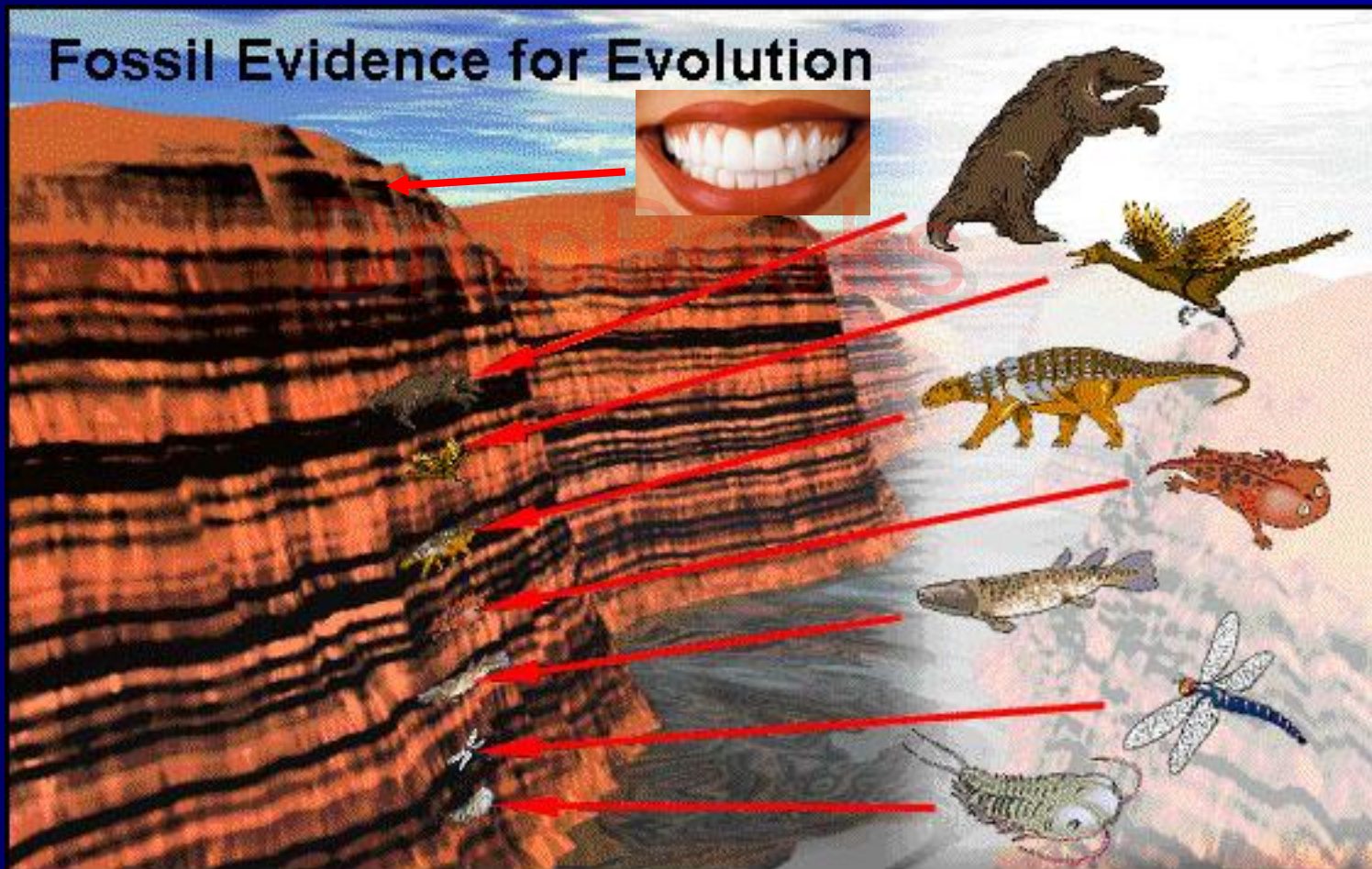


Tooth Whitening – Why?

- n Whiter teeth are associated with perceptions of
 - Youth
 - Attractiveness
 - Self-Confidence



The Evolution of Vital Tooth Whitening



The Evolution of Vital Tooth Whitening

Innovation/Breakthrough



Emerging Technology



Commodity

What's a Commodity?

- n Must-have
- n High demand
- n Numerous options
- n Variation in technologies/types
- n Highly competitive marketplace
- n Highly *confusing* marketplace

What's a Commodity?

- n Creates consumer expectations
 - consistent result/effect time
- n Consumer choice largely based on *price*

Tooth Whitening as a Commodity

n Bewildering array of OTC products



Tooth Whitening as a *Commodity*

- n Bewildering array of OTC products
- n Professionally-dispensed products?
- n In-office procedures?



Tooth Whitening as a *Commodity*

- n OTC vs. in-office?
- n Product vs. *Service*

DropBooks

At-Home Whitening Dentist Dispensed/Supervised

n History: 1970s – 1980s

- Inadvertent discovery by orthodontist using OTC peroxide antiseptic in flexible positioners



At-Home Whitening Dentist Dispensed/Supervised

n History: 1970s – 1980s

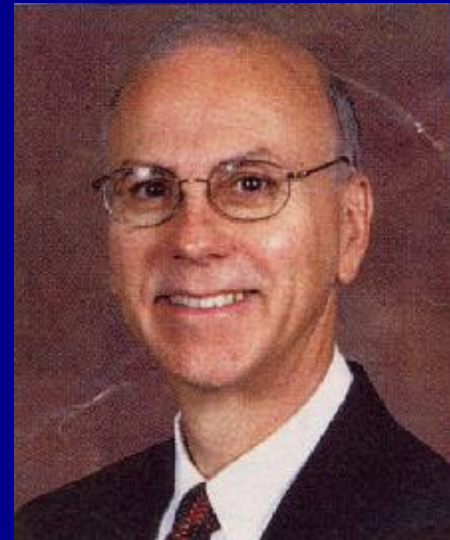
- Inadvertent discovery by orthodontist using OTC peroxide antiseptic in flexible positioners



At-Home Whitening Dentist Dispensed/Supervised

n History: Late 1980s

- Development of “nightguard vital bleaching” technique at University of North Carolina



Dr. Van B. Haywood

At-Home Whitening Dentist Dispensed/Supervised

n History: 1989

- First commercially available peroxide whitening product:

White & Bright (Omnii International)

At-Home Whitening Dentist Dispensed/Supervised

n Indications

- Mild/moderate uniform yellowing



At-Home Whitening Dentist Dispensed/Supervised

n Indications

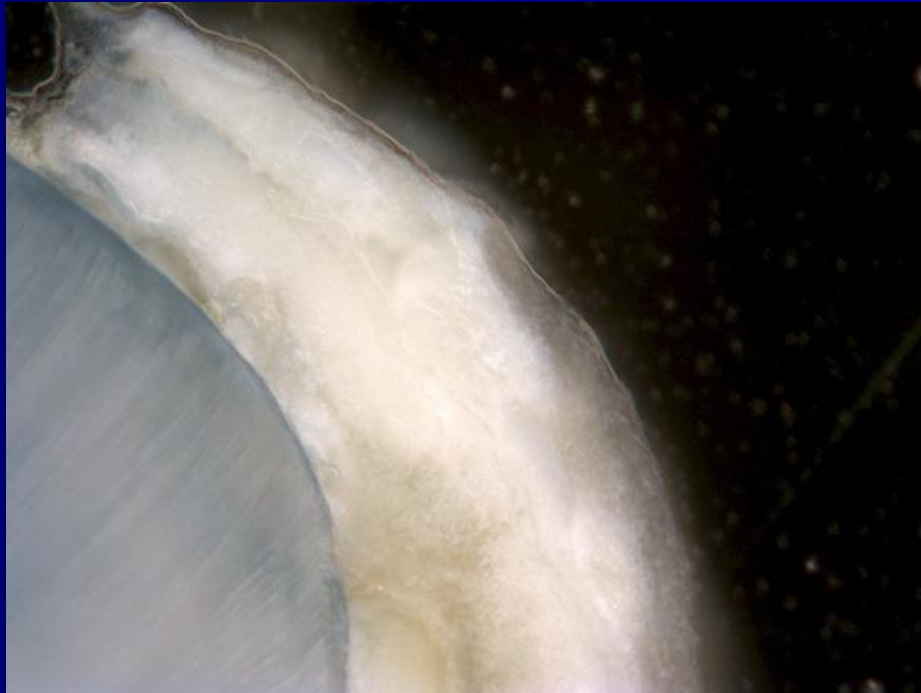
- Blue and grey discoloration – RESISTANT!



At-Home Whitening Dentist Dispensed/Supervised

n Mechanism

- Oxidation of pigmented organic compounds in dentin and enamel



Carbamide Peroxide

name:

urea peroxide

synonyms:

carbamide peroxide

urea hydrogen peroxide

hydrogen peroxide carbamide

exterol

ortizon

hyperol

perhydrit

perhydrol urea

therapeutic:

as a disinfectant

• $\text{CH}_6\text{N}_2\text{O}_3$ - M.W. 94.07

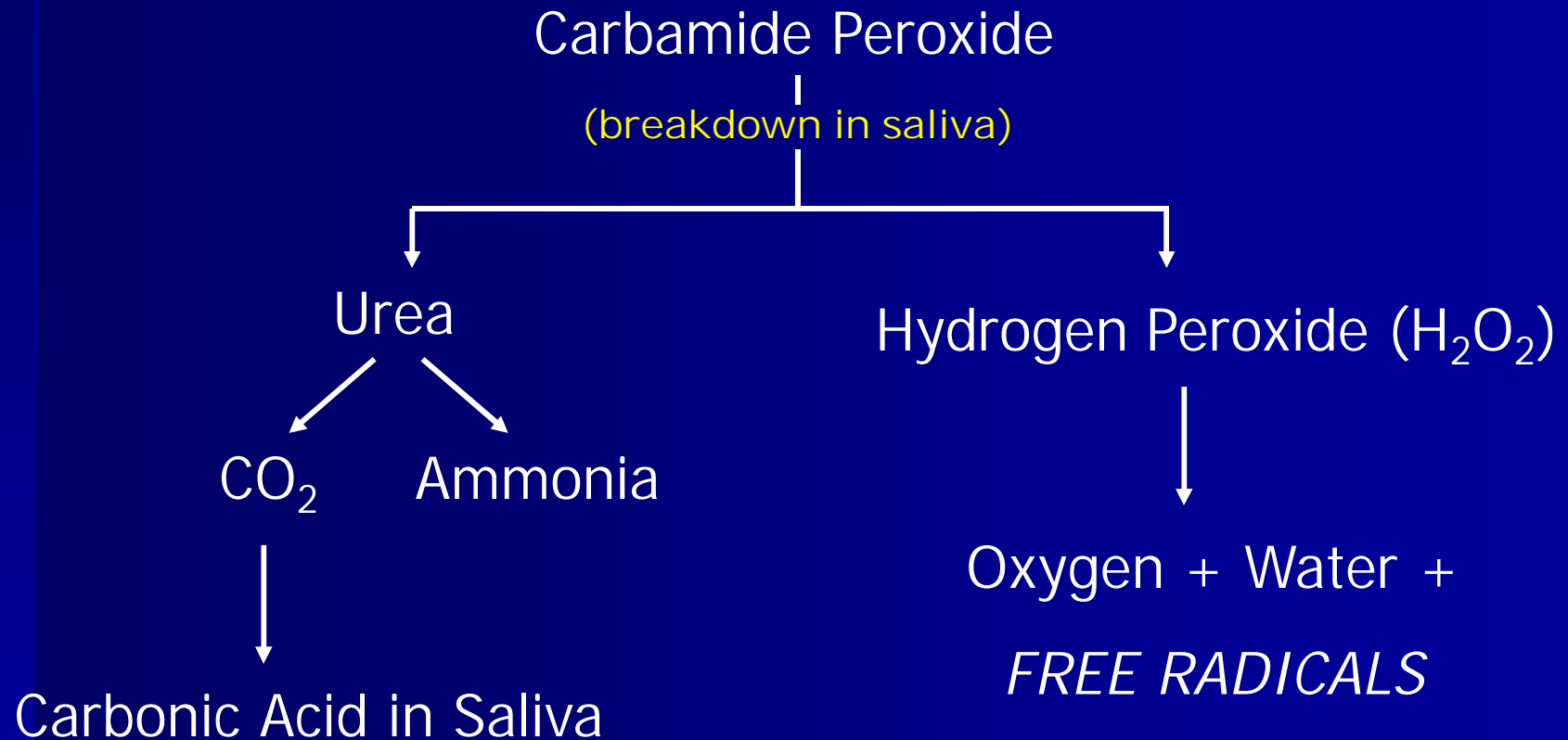
• $\text{CO}(\text{NH}_2)_2\text{H}_2\text{O}_2$ - usually contains 3.4-3.5% H_2O_2



above from Merck Index 11th edition. reference #9783

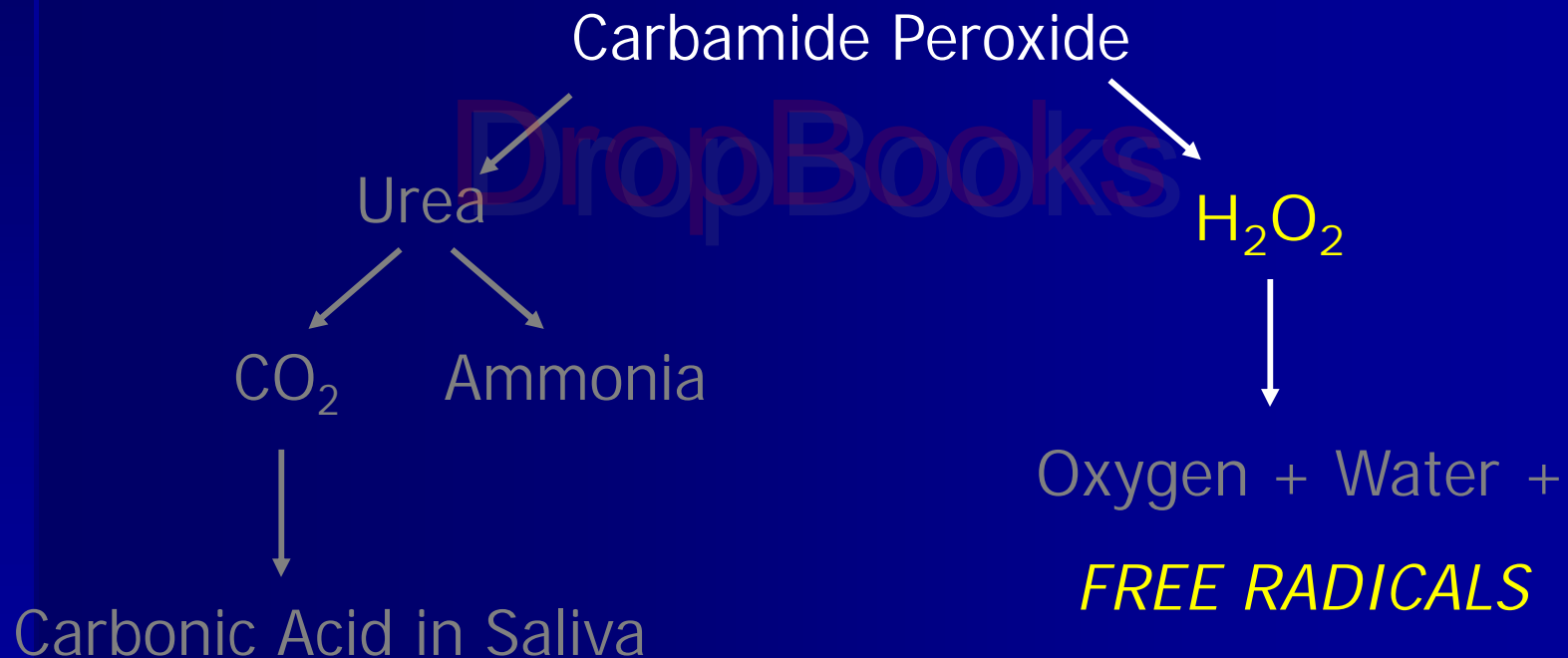
At-Home Whitening Dentist Dispensed/Supervised

n Mechanism



At-Home Whitening Dentist Dispensed/Supervised

n Mechanism – key elements

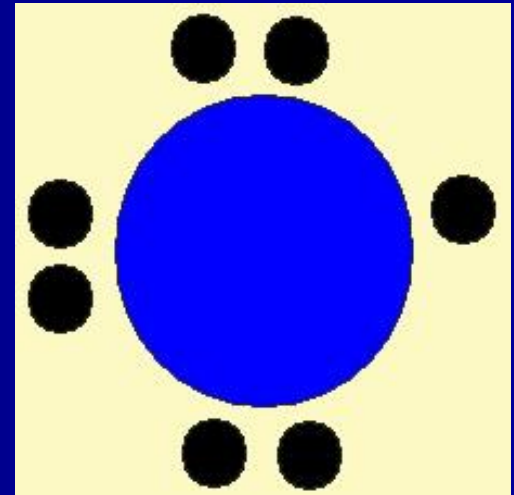


At-Home Whitening Dentist Dispensed/Supervised

n Mechanism

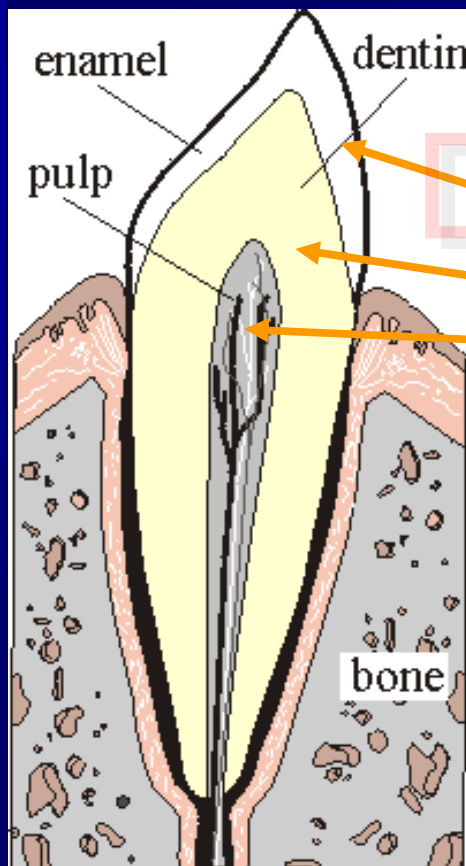
– What is an oxygen ‘free radical’?

- n An oxygen atom with an unpaired (“free”) electron
- n Highly unstable → highly reactive with other molecules to achieve stability



At-Home Whitening Dentist Dispensed/Supervised

n Mechanism



Hydrogen Peroxide

Free Radicals

(penetration into enamel, dentin, & pulp)

At-Home Whitening Dentist Dispensed/Supervised

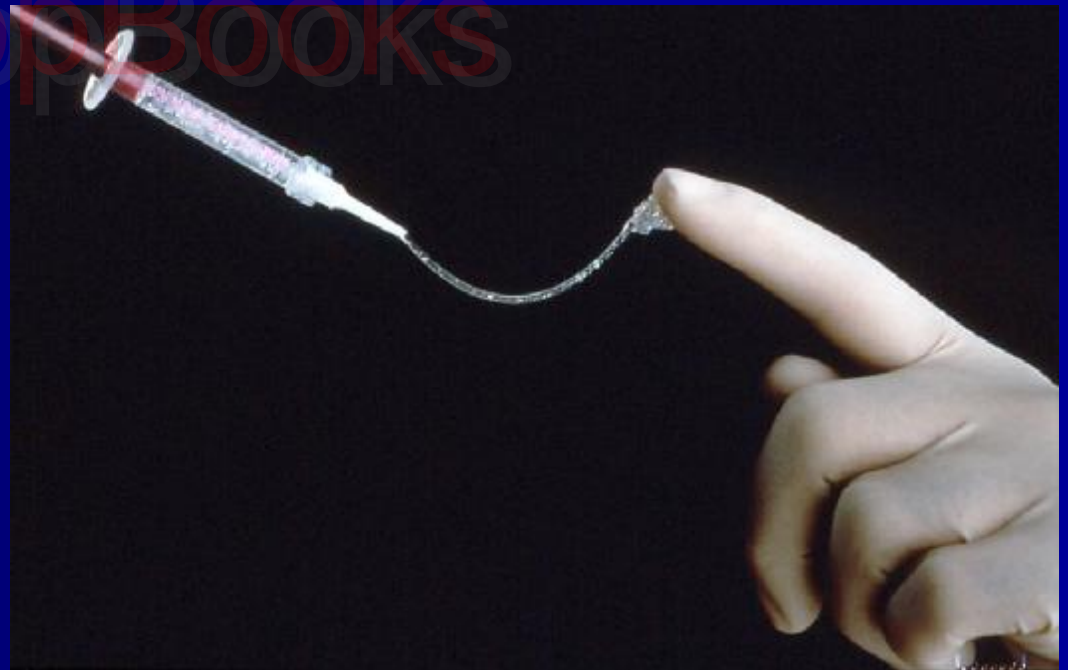
n Mechanism

- Free radicals from Hydrogen Peroxide:
 - n Oxidize stain molecules in DENTIN & enamel
 - n Penetrate to pulp chamber
 - n Are hypertonic – may cause dentinal fluid outflow and SENSITIVITY

At-Home Whitening Dentist Dispensed/Supervised

n Mechanism

- Carbopol – polymer thickening agent
- Increase in:
 - n Viscosity
 - n Shelf life
 - n Peroxide release



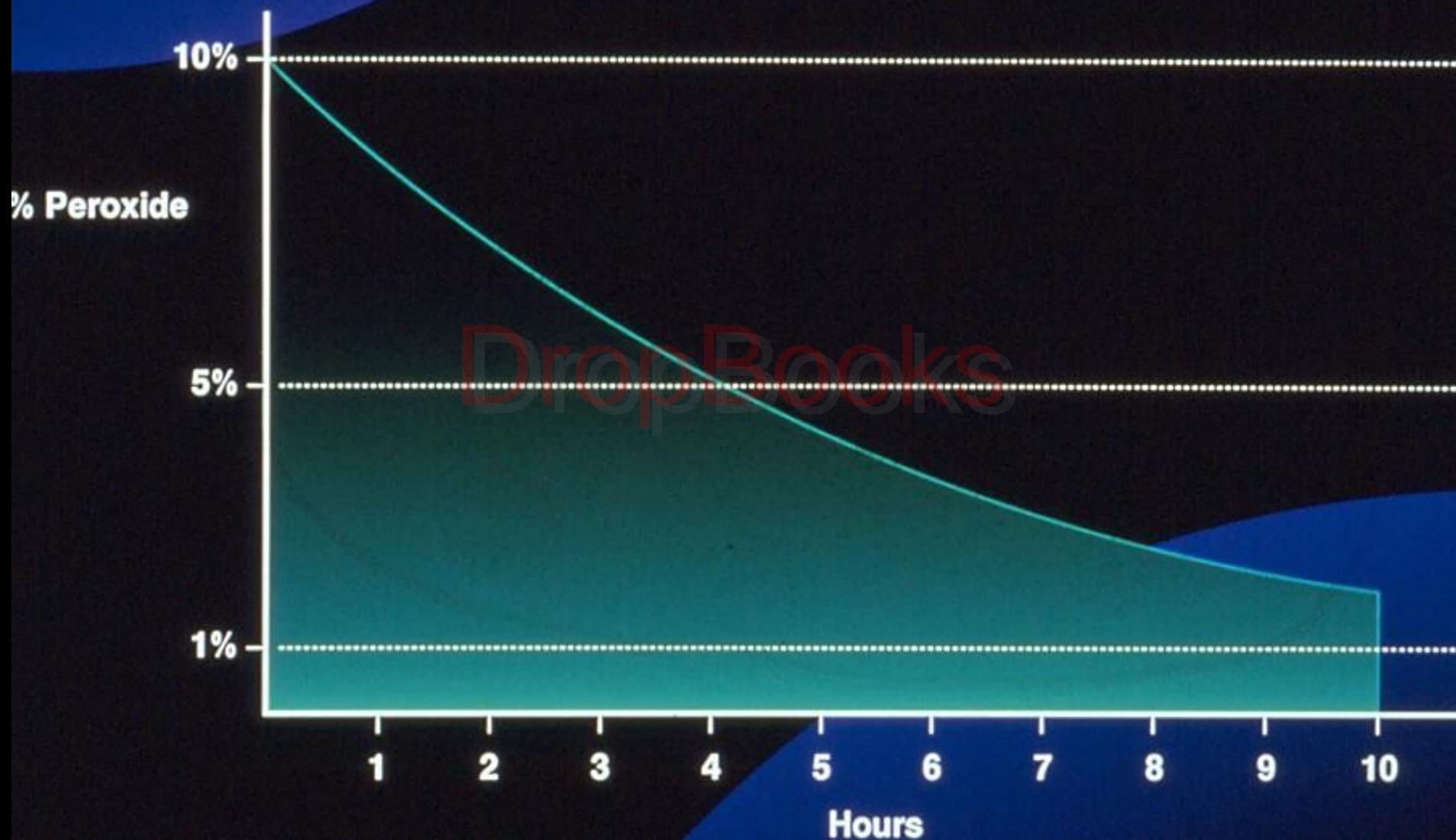
At-Home Whitening Dentist Dispensed/Supervised

n Mechanism

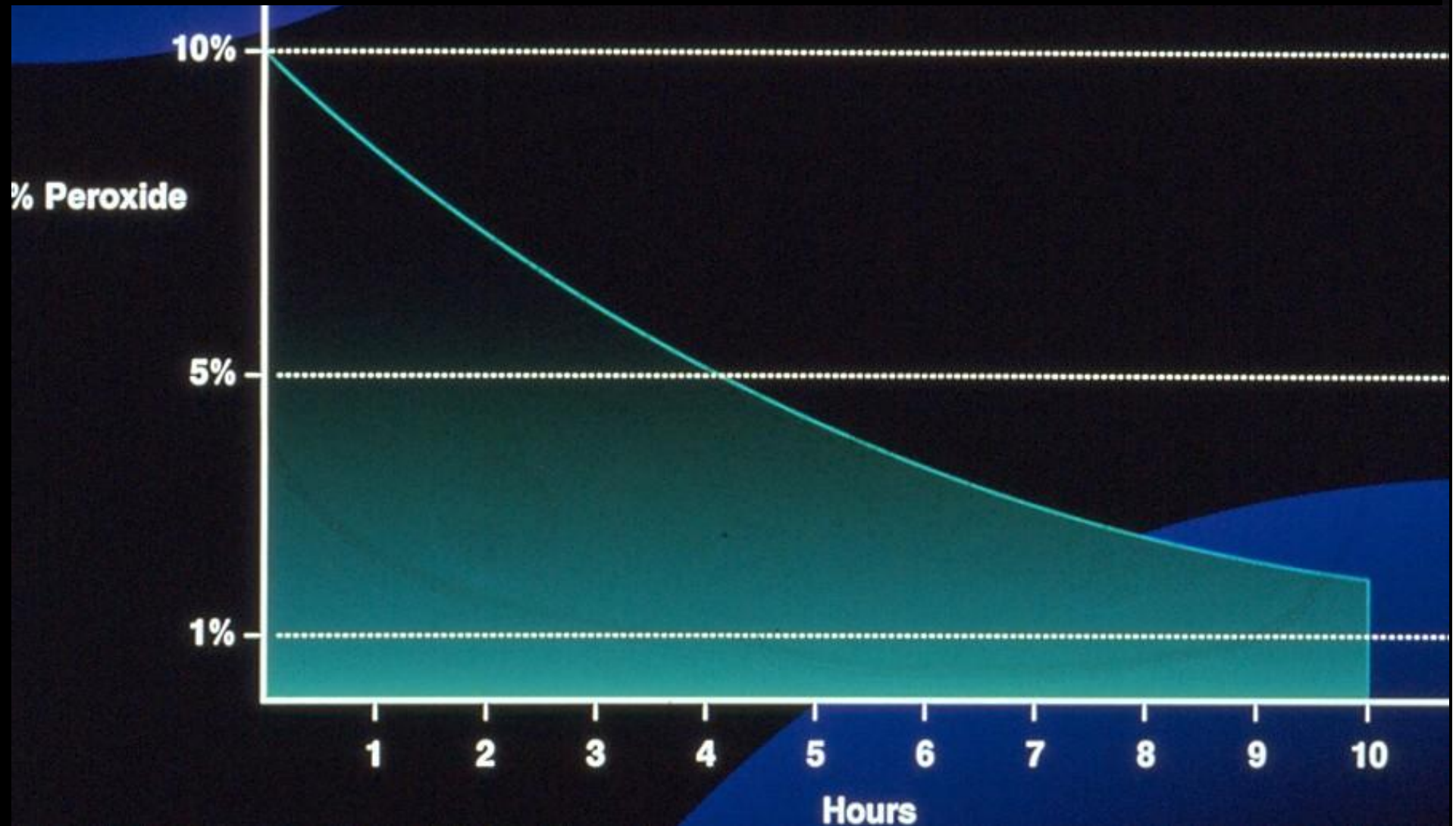
- Carbopol – polymer thickening agent
- POTENTIATES the whitening effect



Opalescence Bleaching System



Carbopol + Carbamide Peroxide = *gradual* release of H_2O_2 over several hours. Overnight use of trays is thus effective.



At-Home Whitening: Procedures

n Tray Fabrication – Stone cast

Horseshoe-shaped:
remove palatal/lingual area

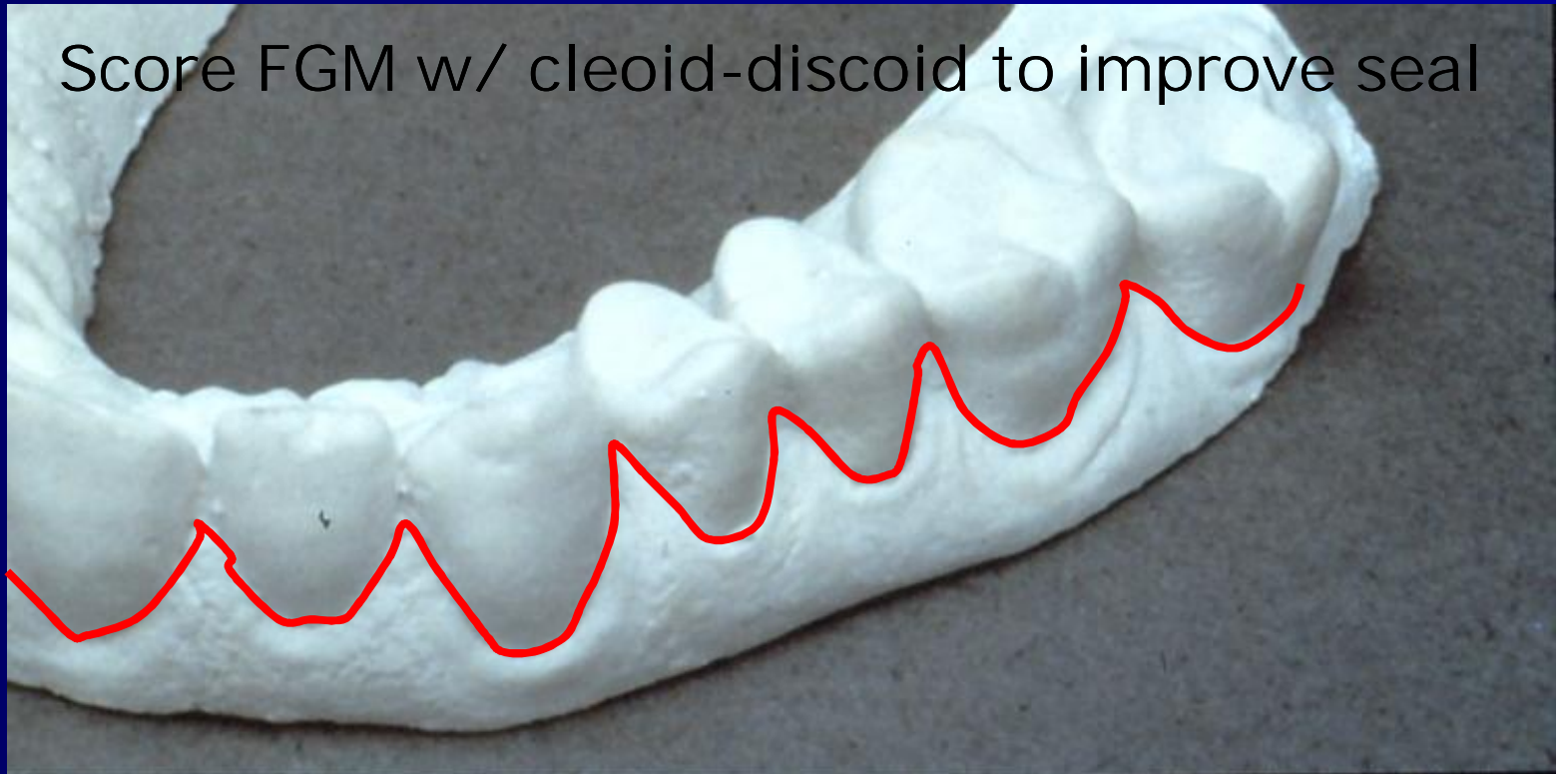
Minimize base
for *MAXIMUM* adaptation



At-Home Whitening: Procedures

- n Tray Fabrication
 - Stone cast

Score FGM w/ cleoid-discoid to improve seal



At-Home Whitening: Procedures

- n Tray fabrication
 - reservoirs?



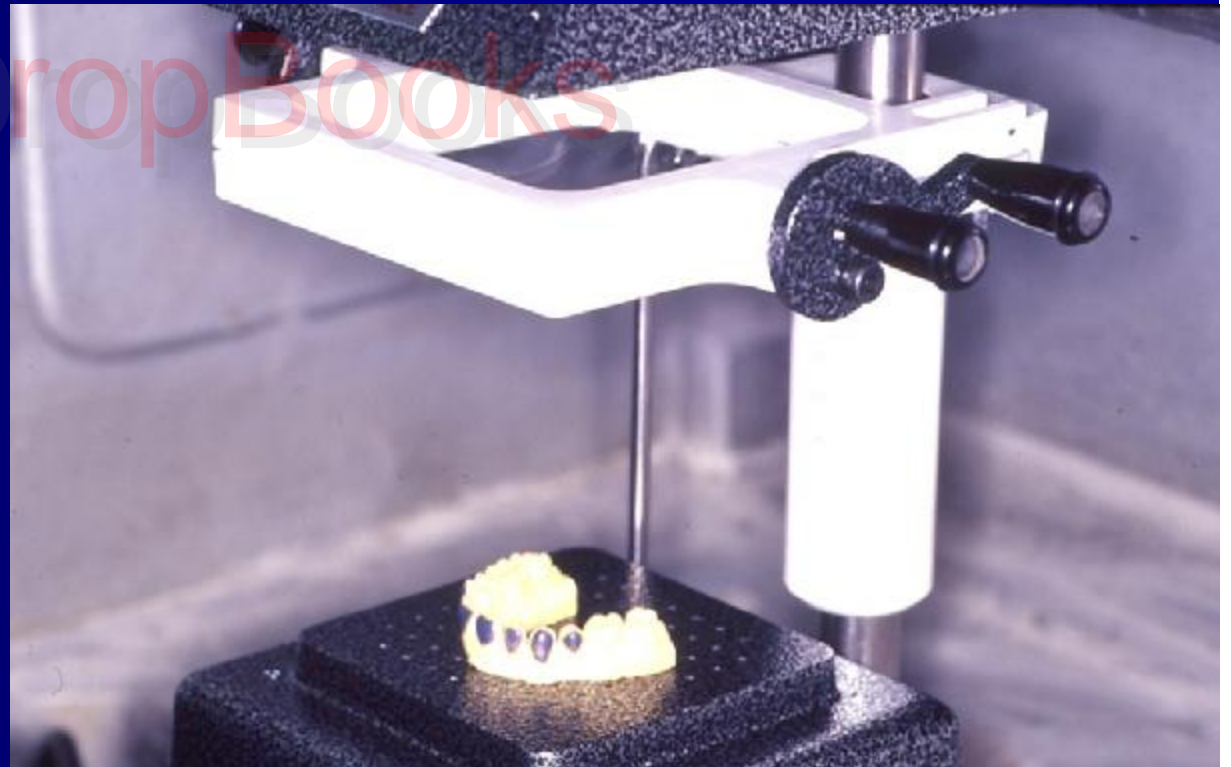
At-Home Whitening: Procedures

- n Tray fabrication
 - reservoirs?
 - ↑ volume of gel
 - ↑ efficacy?
 - ↑ comfort?
- n *Reservoirs are not necessary*



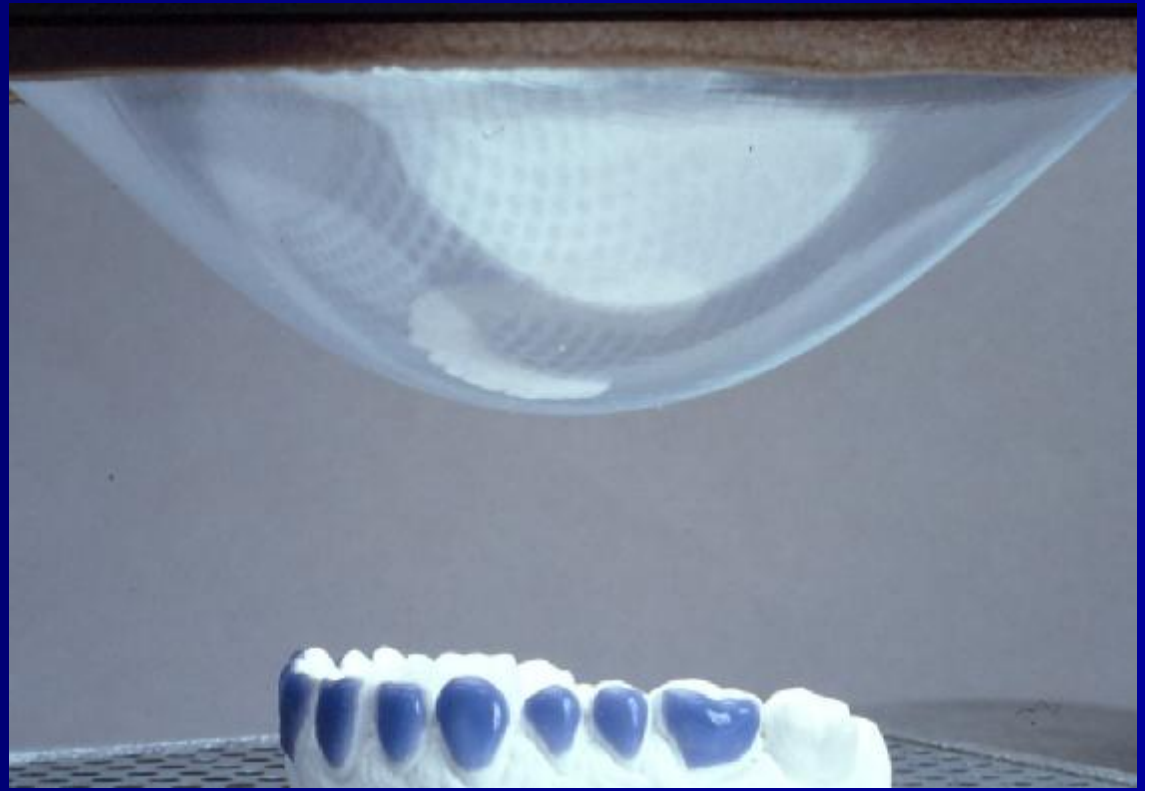
At-Home Whitening: Procedures

- n Tray fabrication
 - 0.035 in. thick flexible material



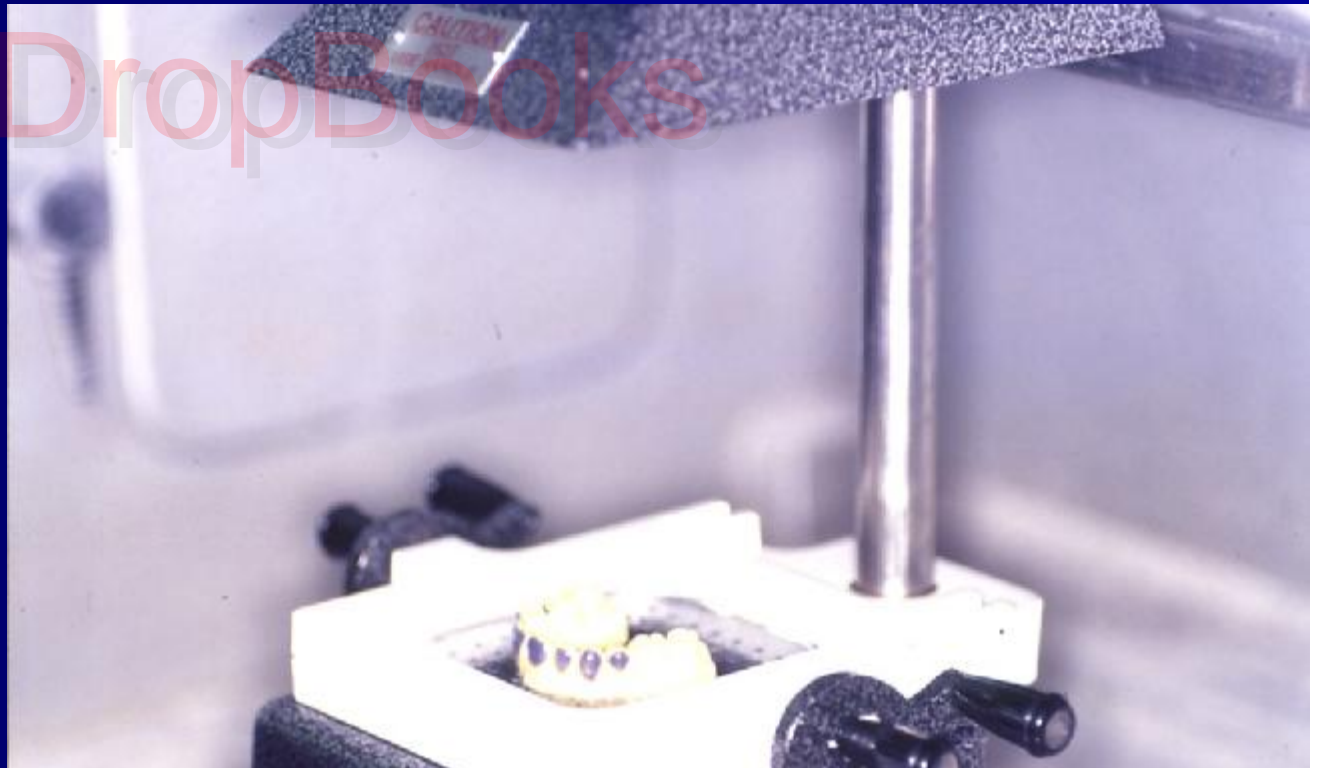
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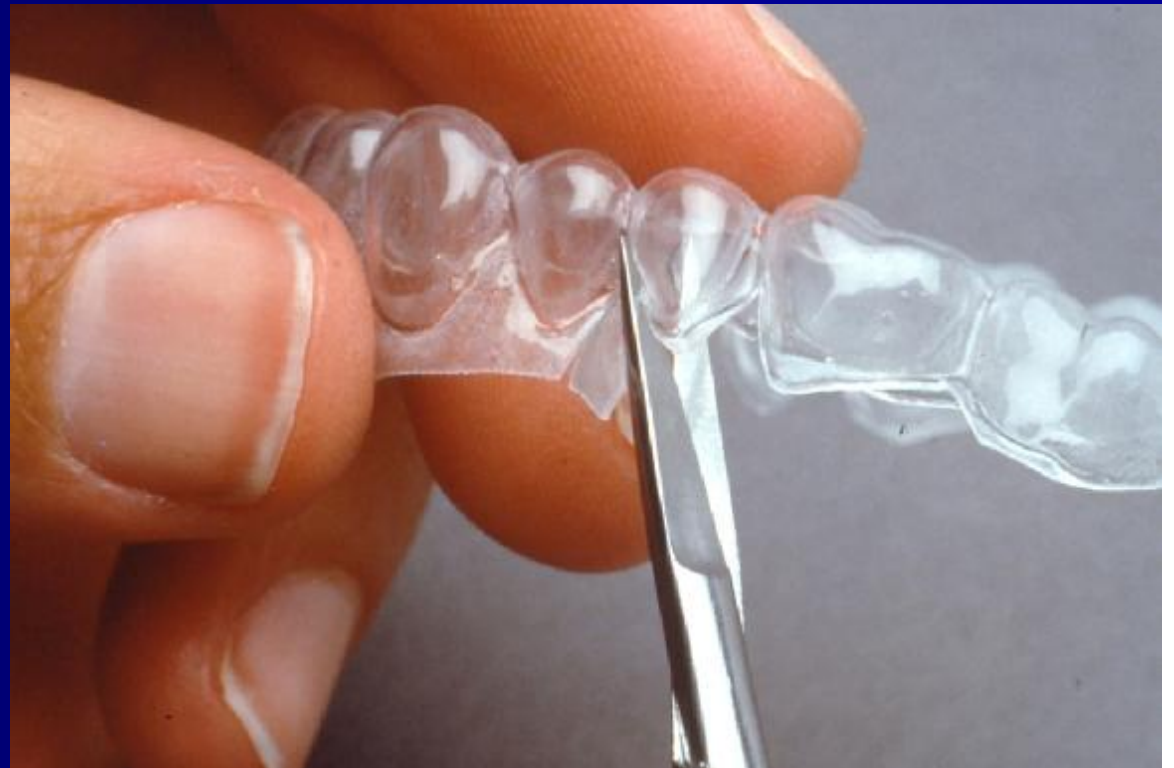
At-Home Whitening: Procedures

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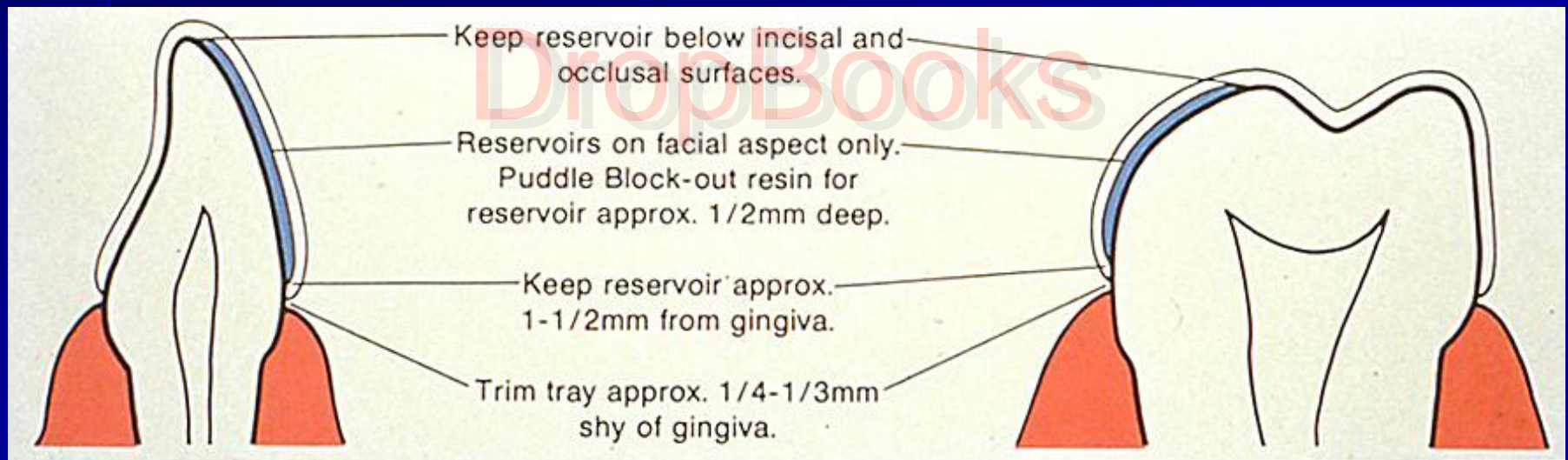
At-Home Whitening: Procedures

- n Tray fabrication
 - Scallop around papillae



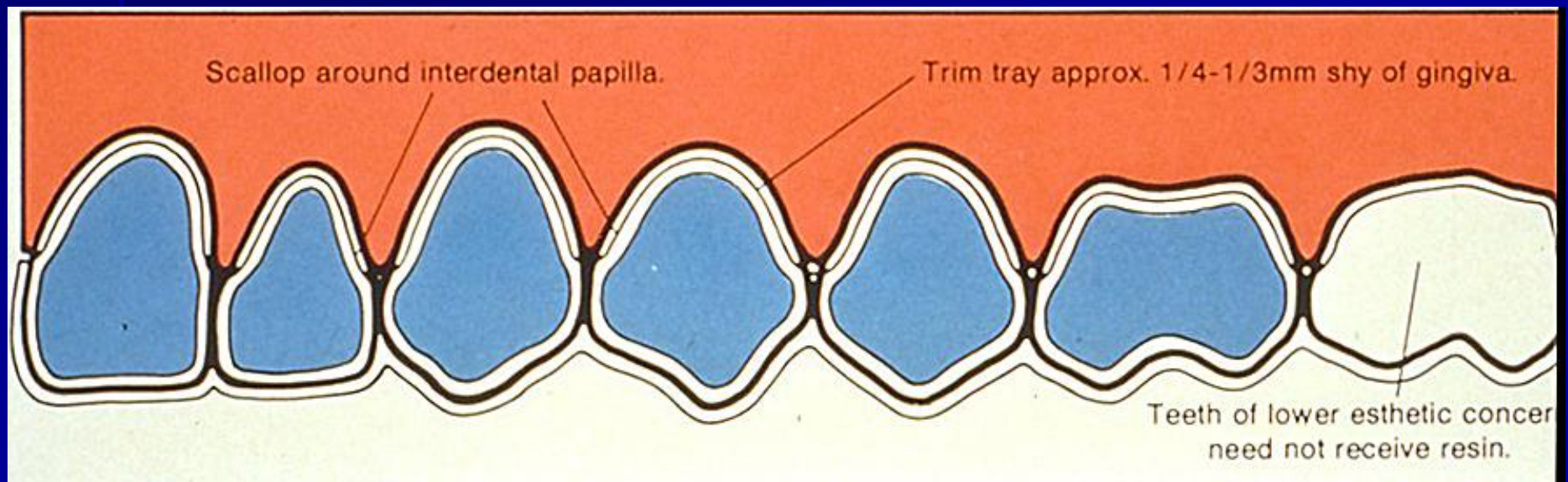
At-Home Whitening: Procedures

n Tray fabrication – summary



At-Home Whitening: Procedures

n Tray fabrication – summary



At-Home Whitening: Procedures

n Finished tray



At-Home Whitening: Procedures

n Finished tray



At-Home Whitening: Procedures

- n Record baseline shade



At-Home Whitening: Procedures

- Record baseline shade(s)



At-Home Whitening: Procedures

n Patient instructions



At-Home Whitening: Procedures

n Patient instructions



At-Home Whitening: Procedures

n Patient instructions



At-Home Whitening: Procedures

n Patient instructions



At-Home Whitening: Procedures

n Patient instructions



At-Home Whitening: Procedures

n Patient instructions



At-Home Whitening: Procedures

n Patient instructions



At-Home Whitening: Procedures

n Patient instructions

- Time-dependant
- Twice daily @ 2 hours, or...
- Overnight



At-Home Whitening: Products

n Nite White® ACP (Discus)

– Carbamide peroxide

n 10% - special order

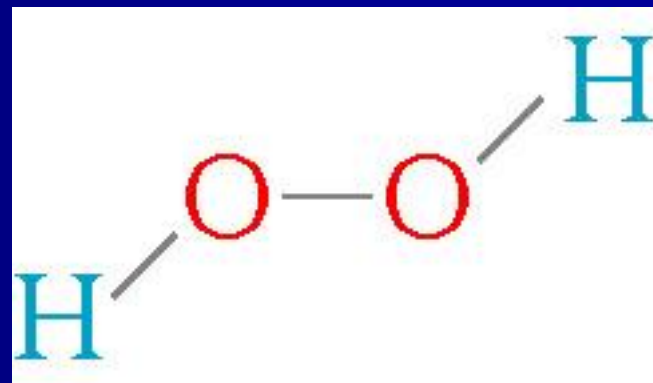
n 16% - STANDARD

n 22% - special order



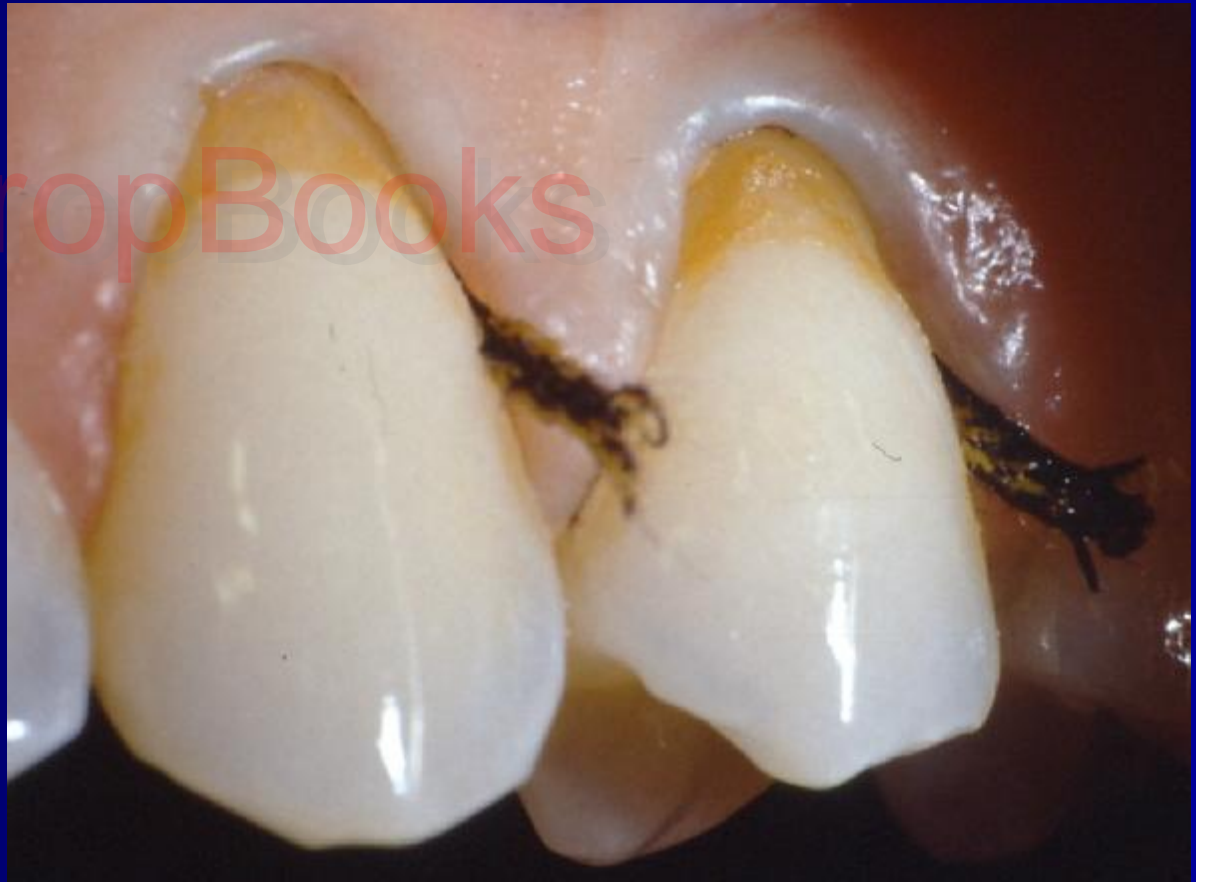
At-Home Whitening: Products

- n Hydrogen peroxide
 - 3% - 9.5%
 - Shorter wearing time
- n Day White® ACP (Discus)



At-Home Whitening: Side effects

n Sensitivity



At-Home Whitening: Side effects

n Sensitivity



At-Home Whitening: Side effects

n Sensitivity

- Most common adverse event
- Not permanent

n Associated with:

- Previous hx. of sensitive teeth
- ↑ frequency of application
- Concentration > 15% CP

At-Home Whitening: Side effects

n Managing Sensitivity

- ↓ daily treatment time
- use on alternate days
- Desensitizing gel (potassium nitrate)
- Desensitizing toothpaste
 - n e.g. Sensodyne (potassium nitrate)
- 0.5% NaF gel
- Ingredients in newer whitening products

Amorphous Calcium Phosphate (CPP-ACP)

n Prospec MI Paste (GC America)



At-Home Whitening: Side effects

n Gingival irritation

(Overextended tray)



At-Home Whitening: Side effects

n Gingival irritation



At-Home Whitening: Longevity

- n Slight relapse occurs after a few yrs.
- n Faster relapse w/ coffee, tea, cola
- n Annual touch-up (3-5 days) typically needed for optimal maintenance

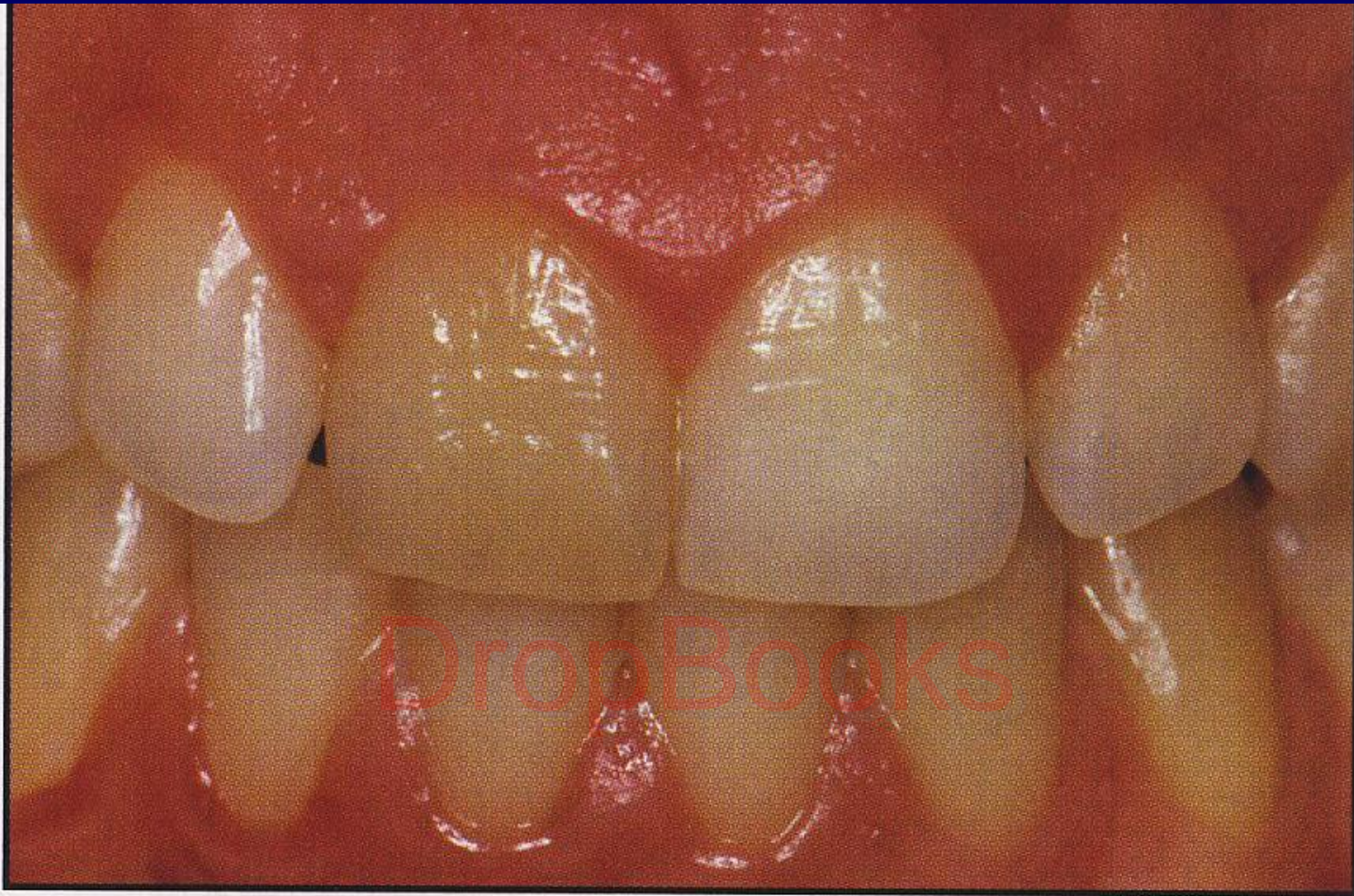


Figure 3. Preoperative evaluation demonstrates discoloration of tooth #8(11) following traumatic injury. Although the canal space within the compromised tooth was calcified, the tooth responded well to cold tests.

(Perdigão, et al, PPAD 2004)



Figure 4. A resin spacer was added to the study model over tooth #8 to facilitate development of a reservoir within the whitening tray.

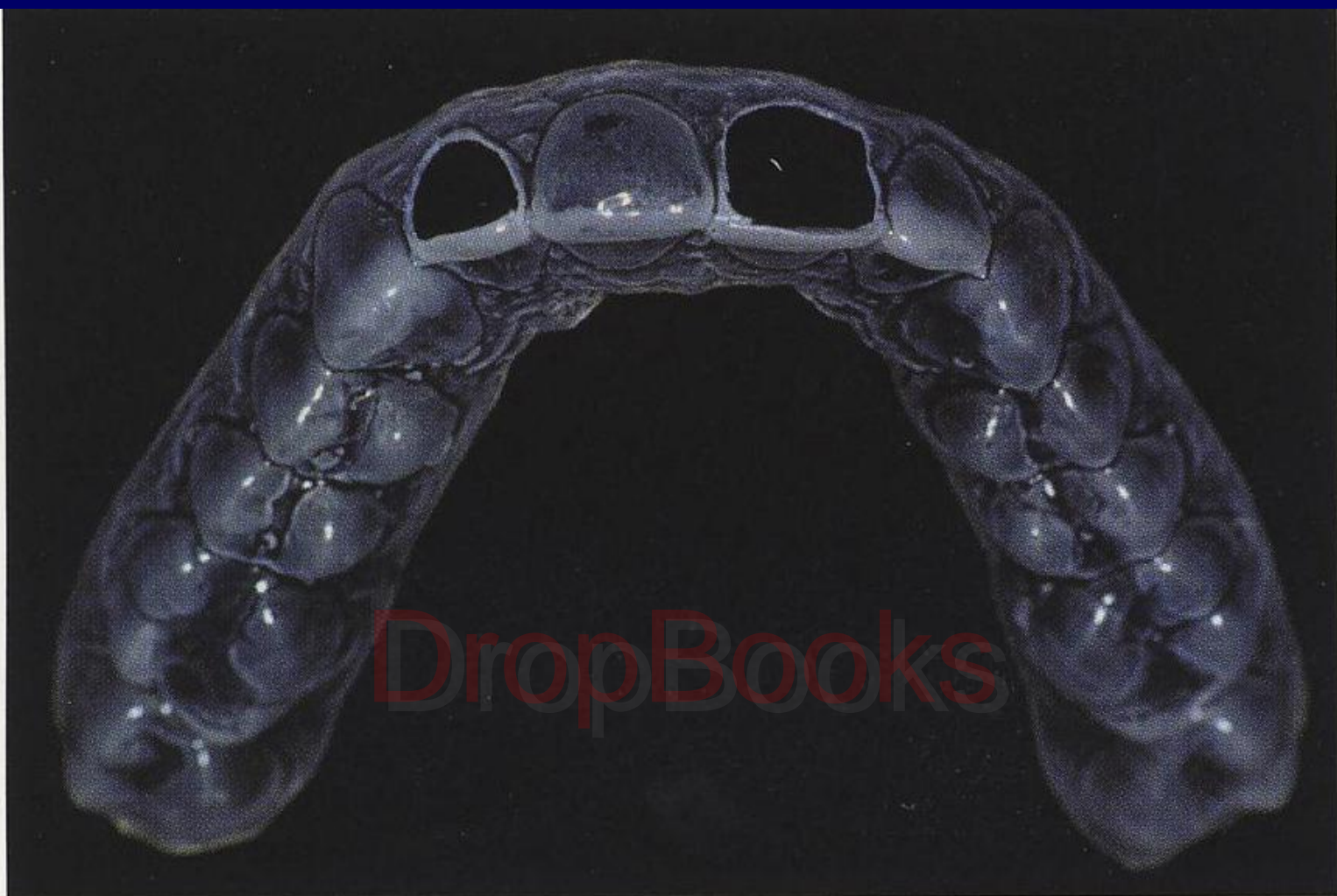


Figure 5. Two windows were cut in the areas corresponding to teeth #7(12) and #9(21) so the teeth would not be affected by the bleaching agent.

(Perdigão, et al, PPAD 2004)

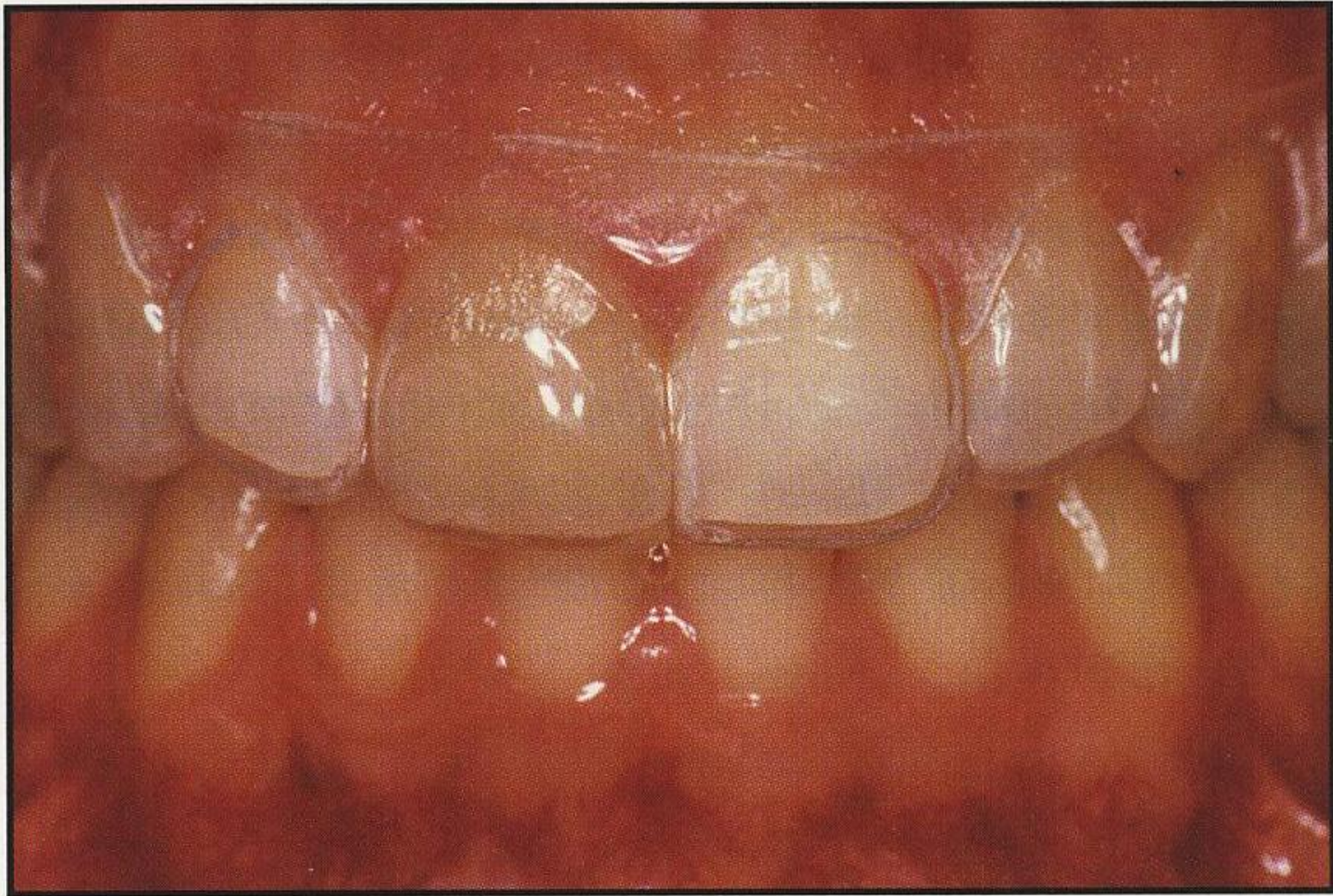


Figure 6. The whitening tray was tried in. Note the space allocated for the whitening reservoir on tooth #8.

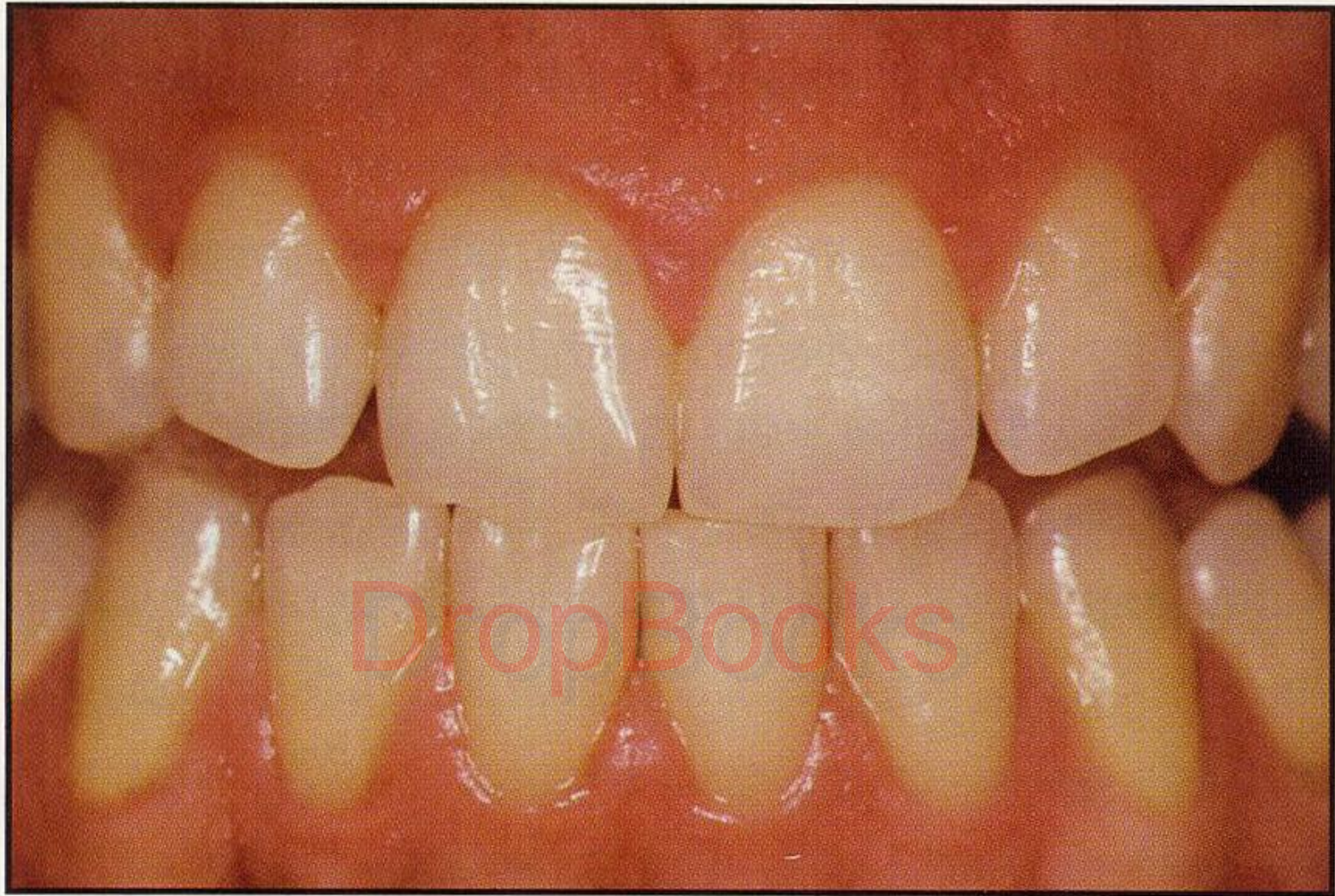
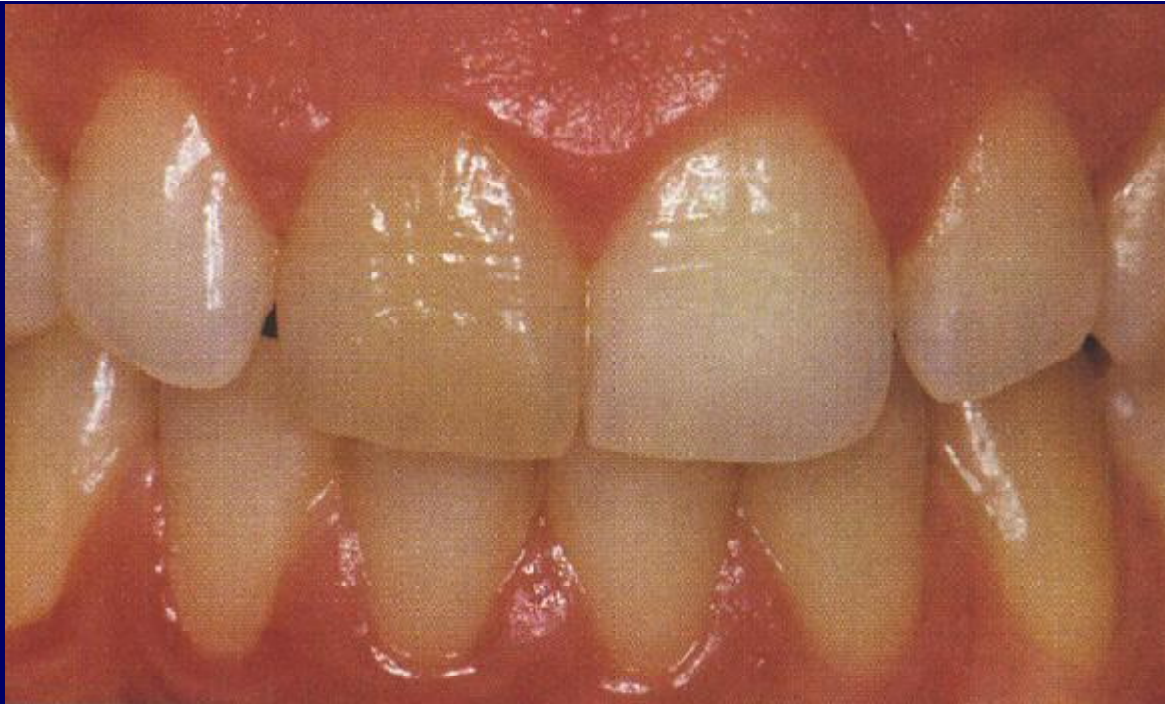


Figure 7. Postoperative appearance following 2 weeks of whitening with 10% carbamide peroxide. Note the increased aesthetics and harmony.

(Perdigão, et al, PPAD 2004)



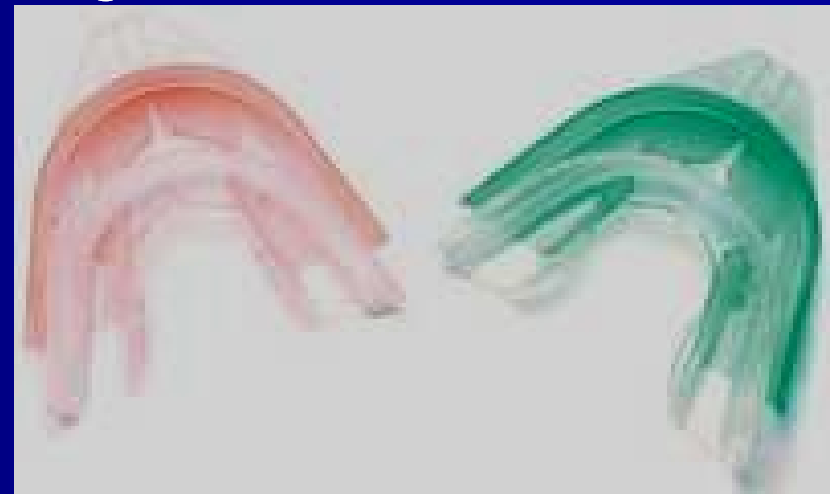
(Perdigão, et al, PPAD 2004)

At-Home Whitening

- new simplified DDS-dispensed system

n Trèswhite (Ultradent)

- Pre-filled, adaptable, disposable whitening trays
- No impressions, models, or lab time
- 9% hydrogen peroxide gel



At-Home Whitening

- DDS-dispensed trayless delivery products

- n Crest Whitestrips Professional

- 6.5% hydrogen peroxide

- n vs. 5.3% in OTC version

- 3-week supply

- n vs. 2-week supply w/ OTC

- Worn for 30 min. twice a day

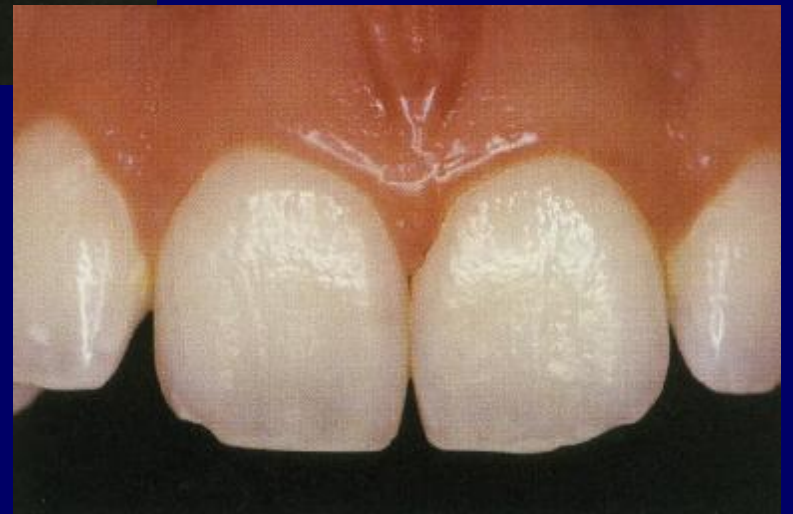
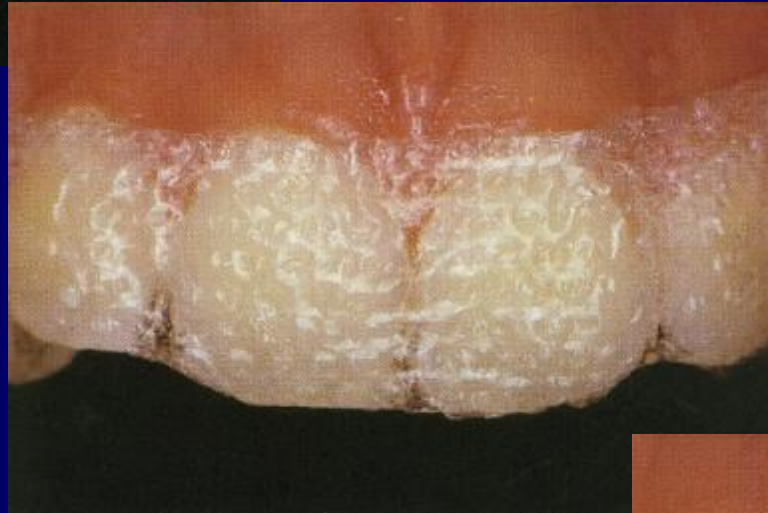


At-Home Whitening

- DDS-dispensed trayless delivery products
 - n Crest Whitestrips Supreme
 - 14% hydrogen peroxide
 - 3-week supply
 - Worn for 30 min. twice a day



Crest Whitestrips



(Perdigão, et al, PPAD 2004)

At-Home Whitening with OTC Products

- n Two types:
 - Peroxide whiteners (bleaching)
 - “Whitening” toothpastes (mild abrasives to remove extrinsic stain)

At-Home Whitening with OTC Products

- n Variation in CP concentration
- n Stock trays
- n No trays
- n Adhesive strips

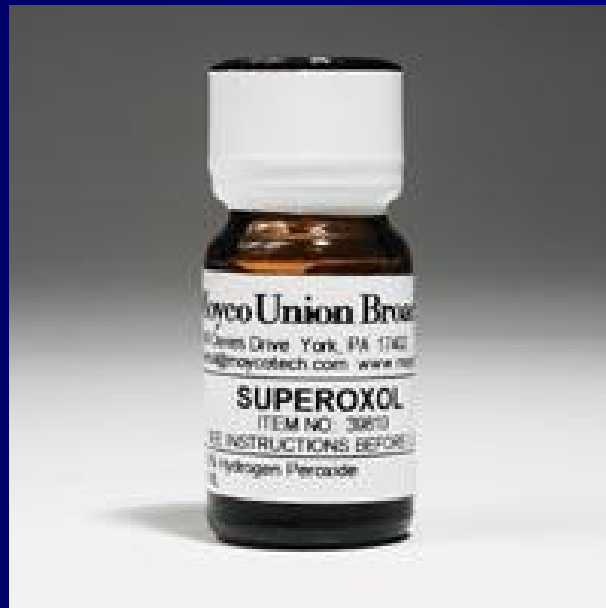


At-Home Whitening with OTC Products

- n Compared to dentist dispensed/supervised:
 - No professional assessment/dx.
 - No custom-fitted tray
 - “One size fits all” approach
 - No professional monitoring and management
 - (Product vs. *Service*)

In-Office Whitening

- n History: 1960s and before
 - Superoxol (35% H_2O_2) + HEAT



In-Office Tooth Whitening

- n aka “power bleaching”
- n HP (H_2O_2), 15% - 40%
- n Chemical catalyst mixed-in at time of application
- n Further activation of HP with high-energy light source

In-Office Tooth Whitening

- n Light sources used:
 - Halogen composite curing light
 - Free standing halogen light
 - Free standing UV light
 - Argon laser
- n Effect of light?
 - Studies are equivocal

In-Office Tooth Whitening

- n Effect of light?
 - Studies are equivocal
- n Laser efficacy
 - Jones AH, et al. J Esthet Dent 1999
- n Light vs. no light
 - CRA Newsletter November 2002
 - Sulieman, et al. Am J Dent 2005

In-Office Tooth Whitening

- n Immediate perceived lightening partially due to *tooth dehydration*
- n Multiple treatments required for maximum effect
- n Expensive
- ü Best used as a “jump-start” followed-up with home tray whitening

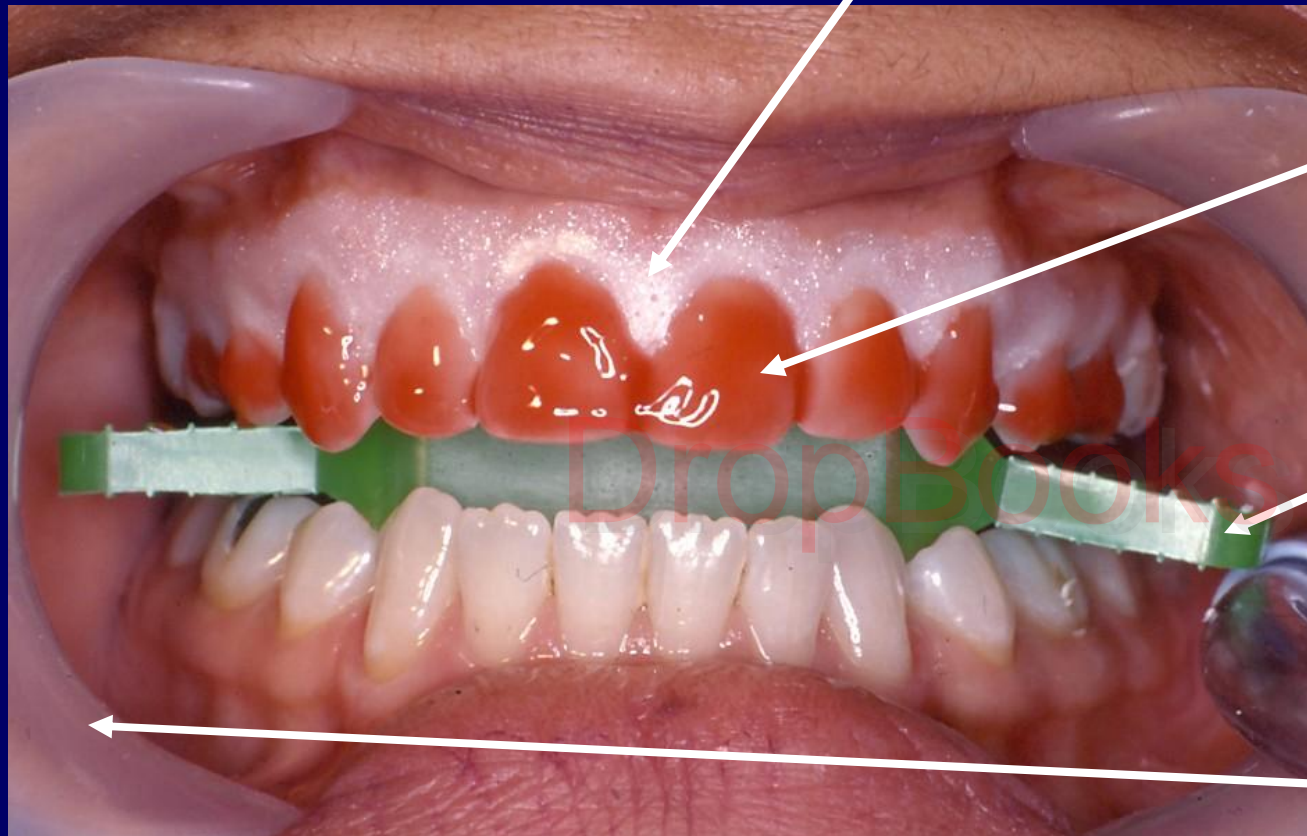
Light-cured gingival barrier

35% HP gel

Bite block

Retractor

Opalescence Xtra (Ultradent)





In-Office Tooth Whitening

- n Is 1 treatment enough?
- n de Silva Gottardi M, et al. Quint Int'l. 2006
 - Avg. color chg./visit – 2.1 to 3.7 units

In-Office Tooth Whitening

- n Zoom! (Discus)
 - 25% HP
 - UV light activation



ZOOM!®

The Science of Smiles



DISCUS DENTAL®

smiles included.

ZOOM2: Redefining Chairside Whitening

DISCUS DENTAL®

www.discsdental.com

New Formulation

- **New proprietary formula**

- Ø 20% Hydrogen Peroxide Gel (4.6g)

- incorporates Amorphous Calcium Phosphate¹

- Ø Creates low sensitivity & less fadeback

- Ø Exclusively deigned to work with Zoom2 Lamp

1: Incorporation of Amorphous Calcium Phosphate is patented technology exclusively licensed to Discus Dental in this field by the ADA Foundation

Amorphous Calcium Phosphate (CPP-ACP)

- n Brand name: Recaldent
- n Developed by ADA Research Institute
- n Milk-derived protein
- n Adheres to soft tissue, pellicle, plaque, teeth



Amorphous Calcium Phosphate (CPP-ACP)

n Prospec MI Paste (GC America)



What's Zoom ?

A completely re-designed and re-energized Zoom2 System

- n 33% Faster - results in in 45 minutes
- n 67% Less Sensitivity
- n Enhanced Patent Pending Formula
- n Easier to use

How Zoom Works

New Light Activation Technology

- n "Photo-fenton" reaction with peroxide & iron
- n "Stain Terminators"
 - Peroxide component reacts with iron to produce hydroxyl radicals
- n Light reaction cyclically renews iron
 - Continues to produce hydroxyl radicals

Before and After



Advanced Optical Light Guide System:



Ensures faster patient set-up for
optimal results

- Ø Interlocking light guide & lip retractors for fool-proof set-up
- Ø Promotes patient safety, comfort and satisfaction

Ergonomically Designed



New locking casters

Ø Ergonomically designed structure

Ø Makes moving and positioning Zoom2 a snap

Other Great Additions

Zoom2's Chairside Kit Now Contains:



- Ø Zoom2 Starter Swab for even lower sensitivity
- Ø Satin Finish™ post-treatment – 5% Potassium Nitrate
- Ø .22% Sodium Fluoride to further reduce transient sensitivity



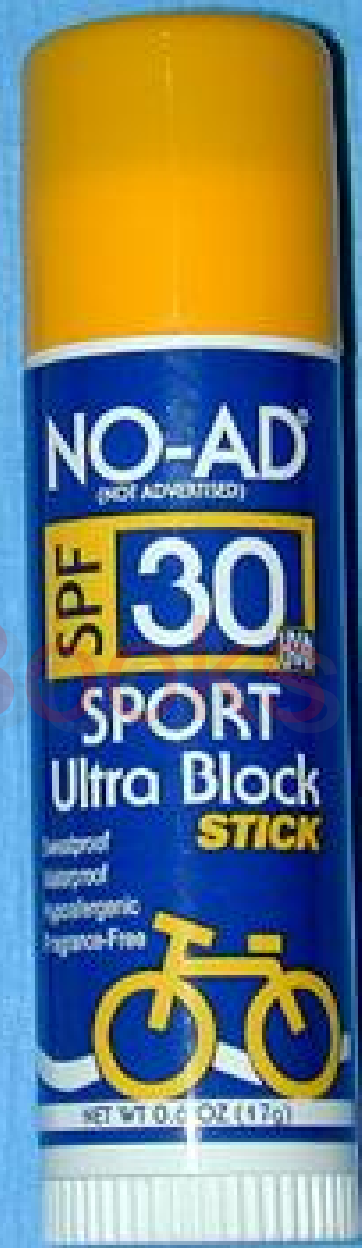
Pre-treatment



Immediate post-treatment,
Zoom! system,
20 min. application x 3

Zoom Isolation Technique

















A close-up photograph of a dental model. The model shows a set of upper teeth with a blue wax bite registration applied to the occlusal surfaces. The wax is a translucent blue color and is shaped to fit the teeth. The teeth themselves are white and appear to be made of a hard material like stone or metal. The background is a dark, textured surface, possibly a dental chair or a workbench. The text "DropBooks" is overlaid in the center of the image.

DropBooks





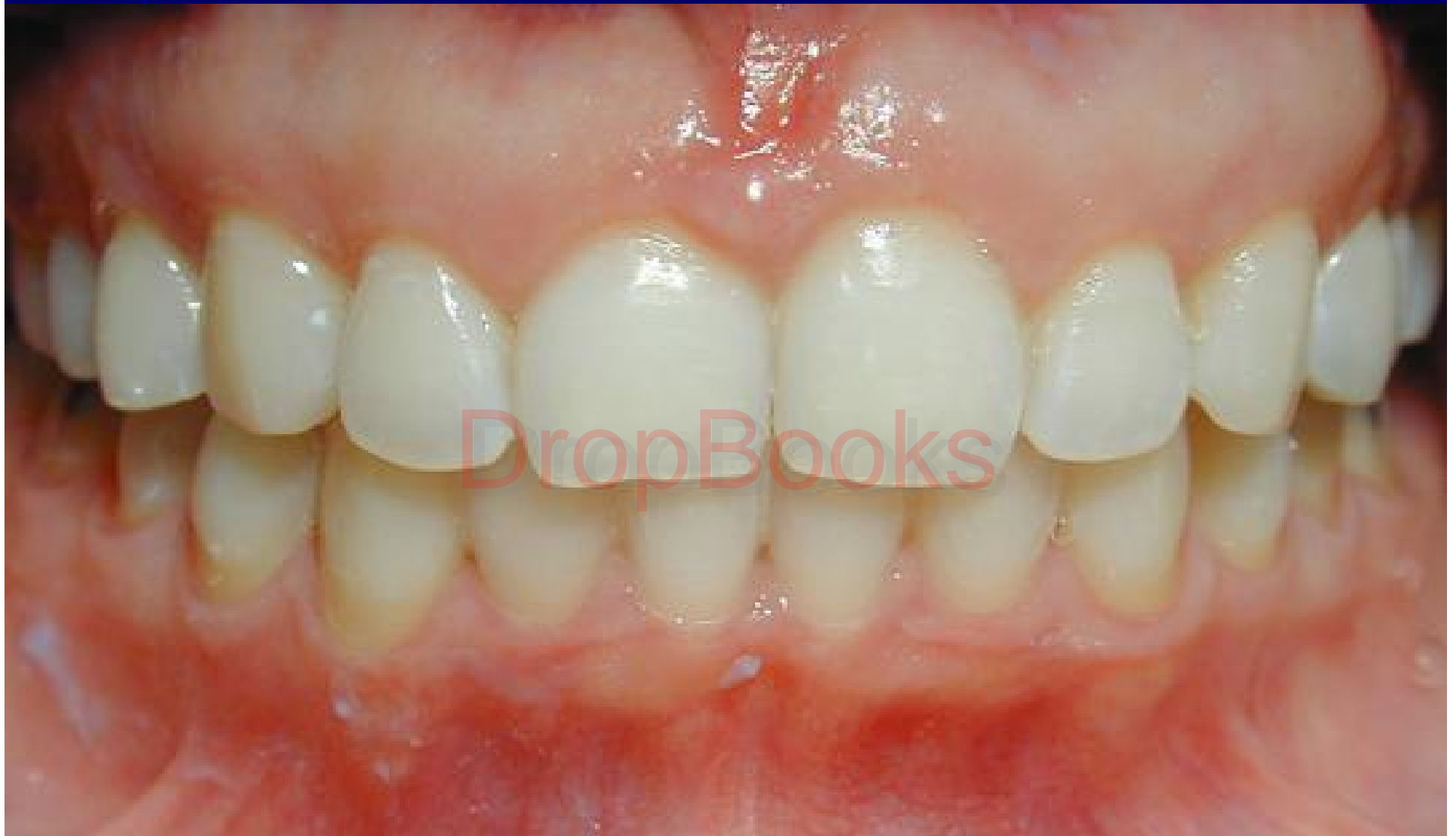
















DISCUS DENTAL[®]

Vitamin E Soothing Oil

0.43g Discus Dental, Inc., Culver City, CA 90232

107



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13-20-45 1102

Tooth Whitening and Restorative Procedures

- n Resin adhesion to peroxide-whitened teeth:
 - Reduced bond strength immediately after whitening
 - Residual oxygen? No!
 - Reduced microhardness? Maybe.
 - WAIT at least TWO WEEKS after whitening to bond

Tooth Whitening and Restorative Procedures

- Shade matching of peroxide-whitened teeth:



(whitened teeth)



lightness

2%

7% 12% 7%

26%

13% 25% 12%

50%

5% 10% 5%

20%

2%

frequency

Tooth Whitening and Restorative Procedures

- Shade matching of peroxide-whitened teeth:
 - Whitening shifts the shade OUTSIDE of the natural color range!



Tooth Whitening and Restorative Procedures

- Shade matching of peroxide-whitened teeth:
 - “Bleach” shades of composite and ceramics are now available



Tooth Whitening and Restorative Procedures

- Shade matching of peroxide-whitened teeth:
 - WAIT 2 WEEKS after termination of whitening to select shade for restorations



UCLA Tooth Whitening Protocol

n Four forms:

- Protocol
- Analysis
- Consent
- Progress